



Natural Resources
Conservation Service

Jimmy Carter
Plant Materials Center

Americus, Georgia

Eastern Gamagrass Performance Report

at the
Jimmy Carter Plant Materials Center



PERFORMANCE OF EASTERN GAMAGRASS (*TRIPSACUM DACTYLOIDES*) AT THE JIMMY CARTER PLANT MATERIALS CENTER, AMERICUS, GEORGIA

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INTRODUCTION:

Eastern gamagrass (*Tripsacum dactyloides* (L.)) is a native, warm season, tall (C4) perennial bunch grass that produces a great abundance of high quality forage that can be utilized for grazing and hay production. It naturally occurs from Massachusetts, west to Michigan, Iowa, and Nebraska, south to Florida, Oklahoma, and Texas. Eastern gamagrass also occurs under a wide variety of growing conditions. It has long been recognized as a highly productive and palatable forage plant. There is a growing interest in Eastern gamagrass as a forage crop in the southern states. Plant materials centers in the southeast are making progress towards the development of an Eastern gamagrass cultivar. These PMC's have screened large populations of Eastern gamagrass for ecotypes with apparent forage production and quality. Therefore a multi-regional study, known as an Inter-Center Strain Trial (ICST), was initiated to evaluate the top accessions at multiple locations in an attempt to reduce the number of potential Eastern gamagrass cultivars based on their regional performance. In 1995, the top 13 accessions were established in plots at Americus and five other centers in a randomized complete block with four replications.

The proposed use for Eastern gamagrass in the southeast would be for grazing and as a silage crop to be used as an alternative to corn silage on sloping and marginal cropland in the southeast. Corn silage is a large contributor to cropland erosion in the southeast. High quality perennial grass silage crops are needed as alternatives to corn for silage production on marginal and sloping cropland. Research in developing Eastern gamagrass as a perennial silage that could cover highly erosive ground reducing soil erosion and water quality problems has been initiated by Big Flats PMC in New York. In 1974, NRCS released the first experimental strain of Eastern gamagrass germplasm, PMK-24, from the composite strain developed from the 1958 collection. In 1988, after further testing and experimentation, the same composite germplasm was released as a new variety.

Eastern gamagrass is a highly productive and palatable forage grass but little information is known about its forage quality when grown in the southeast. There has been limited research documentation on forage quality. No research has been done on its utilization as a haylage crop in the southeast.

Information on yield, forage quality, establishment and management will be incorporated into NRCS FOTG and for the implementation of GLA. Currently there is no information in the field office technical guides relative to Eastern gamagrass forage quality and quantity when managed under southeastern growing conditions.

Field plantings have been established throughout the state to determine the performance of Eastern gamagrass in each major land resource area. Variety trials of 'Pete' and 'Iuka' have been planted for comparison and to determine the best variety for Georgia.

Planting and establishment information was developed by the Jimmy Carter Plant Materials Center in 1993. Fourteen pounds per acre seeding rate provides the best uniform stand. It can be planted with a corn planter ,plant the same time corn is planted in Georgia.

This study was conducted to look at the potential of using Eastern gamagrass as a forage for the southeast and to release a new variety that is more adapted to the southern conditions. It involves both dry matter production and forage quality determination of Eastern gamagrass lines.

MATERIALS AND METHODS:

In 1995, study plots were established at the Jimmy Carter PMC with vegetative material from 13 accessions and one standard called 'Pete' (released by NRCS in 1988). Table 1 lists the plant materials and their origin. Plots were arranged in a randomized complete block design with four replications. In the spring, after most accessions were in boot stage, the test was clipped to 8" from the ground. Two additional clippings were taken each year on an approximate 45 day schedule. Dry matter yields were determined for each clip and yearly total clip. Forage quality measurements will be determined in the future.

RESULTS AND DISCUSSION:

Two years of dry matter yield data from the Jimmy Carter PMC ICST study indicates the accession from Jackson County Texas produced the most consistent high yields (Table 2-3). Data also indicates clipped lines of Eastern gamagrass can produce up to approximately 20,000 pounds of dry matter per acre each year (Table 2-3). This yield is substantially higher than other widely used warm season forage grasses such as "coastal" bermuda and "pensacola" bahiagrass. Under optimal conditions these grasses can produce 12,000 and 9,000 pounds of dry matter per acre each year, respectively.

Table 4 contains the fertilizer record for the ICST study at the Jimmy Carter PMC. Over two years the average yearly nitrogen and potassium applied to the Eastern gamagrass plots was 172 and 149 pounds per acre, respectively. Under these relatively low input conditions, Eastern gamagrass has the potential to produce more dry matter than some other commonly used warm season forage grasses.

After data collection in 1998, this test will be summarized and concluded.

TABLE 1 - EASTERN GAMAGRASS ENTRIES

<u>Accession</u>	<u>State</u>	<u>County</u>	<u>PMC Origin</u>
434493	TX	Hays	James E. "Bud" Smith, Knox City, TX
9066165	TX		Los Lunas, NM
9043762	TX	Medina	East TX, Nacogdoches, TX
9043629	TX	Nacogdoches	TX
9043740	TX	Jackson	TX
9062680	TN	Montgomery	Jamie L. Whitten, Coffeeville, MS
9062708	SC	Williamsburg	Jamie L. Whitten, Coffeeville, MS
9055975	FL1		Brooksville, FL
9059213	FL2		Brooksville, FL
9059215	FL3		Brooksville, FL
9058465	AR1		Booneville, AR
9058495	AR2		Booneville, AR
9058569	AR3		Booneville, AR
'Pete'			Commercial

TABLE 2 - DRY MATTER YIELD OF EASTERN GAMAGRASS ENTRIES BY HARVEST DATE AND TOTAL AT JIMMY CARTER PMC - 1996

<u>Entry</u>	DM Yield Harvest Dates #/AC			<u>Total Yield</u>
	<u>5/22</u>	<u>7/9</u>	<u>8/27</u>	
Montgomery	8974.625	6275.85	4386.85	19,637.3
Williamsburg	5576.65	6764.28	5017.03	17,358.0
Nacogdoches	-----	-----	-----	-----
Jackson	3695.4	7376.2	6319.8	17,391.4
Medina	3422.83	6096.8	5091.08	14,610.7
Hays	5600.95	6627.47	4844.18	17,072.6
New Mexico	6827.08	7377.03	5062.88	19,267.0
Ark 1	5259.08	5535.08	4505.9	15,300.1
Ark 2	4224.75	6151.45	5786.3	16,162.5
Ark 3	3216.2	4352.73	3148.05	10,717.0
Flr 1	856.6	3153.15	2525.6	6,535.4
Flr 2	2557.88	6429.1	4554.03	13,541.0
Flr 3	3141.35	7414.73	4762.3	15,318.4
Pete (1)	7851.4	5031.2	3578.2	16,460.8
LSD (0.05)	1551	1076	768.7	2657
CV	22.98%	12.41%	11.7%	12.08%

(1) Standard of comparison (released by NRCS)

**TABLE 3 - DRY MATTER YIELD OF EASTERN GAMAGRASS ENTRIES BY HARVEST
DATE AND TOTAL AT JIMMY CARTER PMC - 1997**

<u>Entry</u>	DM Yield Harvest Dates #/AC			<u>Total Yield</u>
	<u>5/20</u>	<u>7/15</u>	<u>9/4</u>	
Montgomery	8362.65	4646.80	4396.78	17,406.237
Willamsburg	4896.53	7258.08	4293.85	16,448.46
Nacogdoches	4335.68	3533.74	3379.20	11,248.62
Jackson (2)	8497.65	8089.99	5811.56	22,399.21
Medina	6126.28	6067.40	4310.44	16,504.11
Hays	6963.80	5732.85	5006.13	17,702.78
New Mexico	7686.20	4947.75	4338.25	16,972.22
Ark 1	7726.83	5001.28	3345.86	16,073.96
Ark 2	6171.50	3500.58	3121.26	12,793.33
Ark 3	3605.93	1966.96	342.99	5,915.86
Flr 1	2416.35	3059.17	2219.57	7,695.09
Flr 2	5498.95	6324.82	4359.44	16,183.20
Flr 3	6589.70	6703.8	4659.28	17,952.78
Pete	6636.30	3585.31	2507.94	12,729.54
LSD (0.05)	1224	1001	1072	2846
CV	14.00%	13.91%	20.15%	13.39%

(2) Highest total yield

**T A B L E 4 - E A S T E R N G A M A G R A S S F E R T I L I Z A T I O N R E C O R D A T J I M M Y C A R T E R
P M C F O R 1 9 9 6 - 1 9 9 7**

<u>Date Applied</u>	<u>Fertilizer Type</u>	<u>Rate Applied (#/AC)</u>
4-08-96	Murate of Potash Ammonium Nitrate	83.25 147
5-22-96	Murate of Potash Ammonium Nitrate	83.25 147
7-09-96	Murate of Potash Ammonium Nitrate	83.25 147
8-27-96	Murate of Potash Ammonium Nitrate	83.25 147
<i>Total 1996</i>	<i>Murate of Potash Ammonium Nitrate</i>	<i>333 588</i>
3-13-97	Murate of Potash Ammonium Nitrate	83.25 147
5-20-97	Murate of Potash Ammonium Nitrate	83.25 147
7-15-97	Murate of Potash Ammonium Nitrate	83.25 147
9-04-97	Did not apply any fertilizer	
<i>Total 1997</i>	<i>Murate of Potash Ammonium Nitrate</i>	<i>249.75 441</i>

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